NFTS | NATIONAL FILM AND TELEVISION SCHOOL

Course outline: Digital Effects

The MA in Digital Effects is a specialisation within the broader **MA in Film and Television**.

The course represents a steady progression, beginning with the basic technology and skills and ending with the responsibility for finishing effects or finishing the post production on a range of graduation film, television and games projects. At each stage, additional skills are added through specific workshops to provide a comprehensive education that is of great value in understanding and communicating with other industry professionals.

Using the latest equipment and technology, or their initiative to find a creative solution, students work on a variety of NFTS productions, as well as departmental exercises and cross-disciplinary workshops.

By the end of the course, each student will have evidence of work in:

- CG and/or Compositing and/or Colour work across multiple NFTS student productions
- Creation of Graduation Showreels
- Specific examples of individually specialist work in the creation of Effects content and/or Grading/Onlining in particular focus areas.

The first year of the course is focused on teaching the range of advanced craft skills and the underpinning learning and education required for students to develop the mastery they need to progress their creative potential and deep learning.

The second year allows students to continue this development and demonstrate their creativity through practice. It ensures the students become independent learners often generating their own self-set briefs or working with teams of students on projects.

Throughout the course, students engage in specialist workshops, collaborative projects with students from other departments (for example Production Design, Cinematography and Model Making). Many first-year projects and graduation projects involve a range of Visual Effects and/or Finishing. An example of second year activity is the Animation Graduation films that involve the Digital Effects students who supervise and manage the finishing of the films, as well as the effects work – often helping with the animation pipeline from scripting stage right through to delivery.

Commitment and motivation are essential throughout the course and a willingness to engage in debate and discussion to try to find creative solutions to problems encountered.

Good, open communication between students, tutors and coordinators is absolutely vital from the beginning to the end of the course.

Technical and Creative Tuition Year One

Workshop 1a: The Common Agenda (Springboard)
This series of lectures, presentations, demonstrations, seminars, masterclasses and practical exercises are common to all the MA specialisations and are designed to illustrate what is involved in the work of each of them and how this expertise fits into the jigsaw of production. These events are designed to introduce the students to a common language within the NFTS and a solid, basic understanding of the principles of filmmaking and television and games production.

Workshop 1b: The Fundamentals
This is an essential introduction or recap of pixels, bit depths, formats, rgba channels, sub division and polygonal surfaces, xyz and 3d space, aspect ratio, naming conventions and the studio pipeline; video legacy; colour spaces and colour management, lenses and camera theory, VFX and picture post production job roles.and other technical fundamentals that often blocks progress later in the learning process.

Some sections of this module may also fall naturally into place during other learning modules. By the end of the first-year other topics covered may include: Post Production processes – traditional and digital; an intro to Colour and Digital Intermediate Pipelines and the ACES colour system; Scripts, Storyboards and Pre-visualisation; Scheduling Workflows and Pipelines; VFX Production and Budgeting

Elements of these sessions may well be repeated at different stages throughout the course, adding additional information and tuition as and when required.

Module 1: Take One Painting (TOP)
Take One painting is a cross-specialisation exercise in three distinct parts that allows for a collaborative approach to be taken on a practical film project for the first time on the DFX course. It begins with the Year 1 Production Design students creating a set that exactly replicates a fine art painting, for example by a Dutch Master. The Year 1 Cinematographers light the set and film the action, and then the DFX students create a 3D set extension and digital environment inside and outside the set. The DFX students then create a composite image of the results for assessment and discussion.

Students work closely together to form good relationships and a practical understanding and awareness of each other's roles, as well as learning new practical and technical skills on a green screen set with digital camera kit and a full crew. On-

set diplomacy is a vital skill for the DFX students with ambitions to become VFX Supervisors later in their careers. Once filming is complete, the DFX students work closely together as a team to create the required 3D set extension and digital environment. Each student then presents their own version of Take One Painting shot for assessment.

Following the tremendous success of previous exercises, the industry advisory panel rated this project as one of the most realistic and relevant in VFX education in the UK.

Three workshops give the initial key skills needed to complete each students Take One Painting Project. A range of smaller challenges, shot based exercises and reviews build the basic skills and provide an important foundation to the traditional VFX pipeline still used in industry. Workshops in Camera Tracking, Maya and Nuke are wrapped into the Take One Painting Module's tuition. The difference in mode between taught sessions and studio sessions will be clearly explained and expectations around conduct during these sessions will be clearly defined before we start with the workshops outlined below.

Workshop 1c: VFX Camera tracking
Still considered the first principal in VFX – the camera's view point is everything. This reflects the orthogonal view that the Production Designer's will also draft the set design from (with reference to the chosen painting). Students learn about the importance of Film Back, lens focal length and format aspect ratio, camera mapping, object tracking, point clouds, geometry, parallax, placement and specification of tracking markers, classification of camera movement, fixed and prime lenses, track error rate and user defined tracks. At the end of the workshop, students need to feel confident in solving their own camera and reference geometry that can be exported into both Maya and Nuke.

Workshop 1d: CG Fundamentals in Maya
This workshop is a major undertaking for the DFX students and features a consistent block of CGI tuition that aims to introduce the students immediately to the practical and theoretical techniques involved in matching the style, colour and lighting of the practical set-build, that has been photographed by cinematography. The skills developed here are the foundation for more specialist learning in cg that is part of the other modules on the course. It also enables the work that needs to be done to create the set extension elements for the Take One Painting project,

Students will be given an overview of the entire 3D process, using the industry favourite Autodesk Maya 3D application, the tutors will introduce them to the use of render cameras, hold out geometry, modelling, surfacing via projection methodologies and cg beauty rendering for compositing. Important disciplines concerning on set surveying and data capture, lidar scanning and lighting emulation, camera tracking and match moving, naming conventions, data pipelines and render farm management are also be addressed.

Workshop 1e: Compositing Fundamentals in Nuke
This workshop runs alongside the 3D CGI tuition and aims to introduce the Students immediately to the practical and theoretical techniques involved in photorealistic

digital compositing, whilst also starting to develop an understanding of the breakdown and construction of film and broadcast sourced digital image material. As their knowledge of the industry-standard Nuke application and their confidence with 2d and 2.5d compositing techniques grows, the level of tuition becomes increasingly complex Techniques is 2d and planar tracking, image projection, basic digital matte painting, marker removal, edge restoration, match grading, green screen keying, masking, rotoscoping, paint and shot finishing are all taught.
DFX students learn the first principles of how grading and layering operations work as they can then be applied to any of the available VFX applications, ending with the final composite for the Take One Painting project.

Workshop 1f: Foundation in On-Set Data Capture
Students work in small groups and learn the process of capturing HDRI's, set surveying, texture photography
and who to ask for information on set.

Workshop 1g: CG Lighting and aovs - Non-Real Time Rendering Fundamentals
This workshop comes at the end of the Take One Painting after a final review of everyone's shots. It moves on from digital matte painting and projection as these techniques were used to surface geometry and establishes the practice of cg Look dev, use of HDRI data/photography and multipass cg (aov) rendering to go into comp

Workshop 1h: Nucoda
An introduction to the Nucoda system and how VFX is delivered to the grade. The fundamentals of dynamic range, falloff and exposure in relation to finishing cg and VFX shots. The idea of Original Camera Negative and VFX renders, Issues around grading cg and how a matte rgba flat pack can be delivered for the most control in grading.

Module 2: Models, Miniatures and Motion Control (MOCO)
This is the module which has a motion control multi pass shoot of a miniature set and the addition of cg assets at its heart. There are technical skills to develop and the work we do towards the final brief, will purposely adapt to your interests in VFX specialism and skillset as you come from the first Take One Painting module. This module's technical training MUST serve the appropriate use and understanding of cinematic language and story.

As well as the project mentoring allowing each student to focus on and develop their area of specialist interest within cg or compositing, there is a big emphasis on engendering true collaboration within the VFX group – on the cg side you're individual specialist work, in making assets, a render camera, line-up geometry and correctly balanced IBL sources, should be 'published' and then incorporated into a single Maya scene, taking care to ensure the DFX job scheme is used correctly. On the comp specialist side, plate line up, colour management, aov grading, keying, shot finishing and understanding the cg pipeline on a collaborative project is important.

You'll work within, pre-viz/tech-viz, assets, digital matte painting (dmp), lighting/rendering and compositing specialisms as you make the film (details below)

There is also a series of workshops in Photogrammetry, Tech Visualisation, and on set lighting data (HDRI IBL) capture that everyone should learn to do confidently, as your skills will be called upon during grad season.

The project brief is to make a short piece for screening in the cinema (and subsequent release on social media), which celebrates the collaboration between the Model Making and VFX.

Workshop 2a: Hero Assets and Animation
Hero asset modelling, surfacing, UVing, look development and an introduction to rigging and animation; publishing and instancing in Maya.

Workshop 2b: Photogrammetry and Lidar Scanning
Compare the techniques – pros and cons, practical training in photo capture and use of Reality Capture Software.

Workshop 2c: Pre-Visualisation and Tech-Visualisation
Using a low resolution cg model of the miniature, you will work up a number of camera moves, experimenting with different lenses, consider how the camera on the moco rig's volume creates the appropriate drama with height, movement, and the lens focal length, the concept of a legal camera and test placement of assets and how they might move.

Workshop 2d: Advanced On-set Data Capture
Shooting and processing IBL with Aces colour managed HDRI. Training in Lightroom, Photoshop, PTgui and Nuke.

Technical and Creative Tuition Year Two

At this point in the MA programme, the DFX students start learning the topics in their chosen area of specialism - **CG**, **Compositing** or **Colour**.

NOTE:
The module/workshop descriptions for the individual outcomes are clearly marked "VFX SPECIALISM", meaning for students that wish to specialise in CG or Compositing, or "COLOUR SPECIALISM", meaning for students wishing to specialise in colour and finishing.

Module 3: *VFX SPECIALISM* - Virtual Production, CG assets and FX
This module represents the first major practical exercise in Year Two. It offers another tremendous opportunity to collaborate with other departments within the School – notably Production Design and Cinematography. The students work as a full VFX team and will produce a (very) short film to showcase skills in Real Time VFX. Parts of the production will be digitally filmed on an LED stage

Industry experts give students an overview of the techniques involved in prosthetics make up covering how cut's, lacerations, bruises, burns and the like are made. Training in Unreal Engine to create environments with library elements and light scenes is given as is an introduction to effects simulation using Houdini

Seeing the entire project through to completion will involve elements of editing, compositing and colour grading and offers an opportunity to work with composers and sound designers for music and sound FX.

The module attempts to lead on giving a good critical understanding of real time – in camera VFX. As this is a new module for 2022 and the technology is in flux, for clarity, we have thought about what you'll be learning in a technology agnostic way as possible.

This module is about:

- Learning how production designed assets are modelled to an appropriate scale - but how the same design exists as a practical set asset and a games engine asset-based asset
- Understanding how art department and production design work traditionally in completing a design drawing that we will model from
- Understanding how a DoP light's a set and about what he/she would want to control on an LED stage shoot - both in the games engine and practically - likely a mix of both. The idea of a VP gaffer versus a regular gaffer's role
- Learning how a scene is put together to build the environment, in the games engine that goes behind the production designed hero asset on the LED volume. This needs to tell a story and is more than a technical exercise (within this - we have to consider why we'd need an LED shoot as oppose to shooting the scene on location)
- Learning how to work with limitations and to always refer to what's the drama - what's the action, rather than lazily using the LED volume without thinking - just because we can. A reminder here that on all the master's programmes at the NFTS, technology choices should always be led by the drama/story we are trying to convey on screen
- To consider and learn about real-time camera tracking
- Lens choice and the fabric of the story will be worked out during a previsualisation process - building on the learning from the pre/tech viz processes in MOCO module. This previz film will need to be edited - so we can have conversations about the film with the producer, PM (who we need to help us scout a location), cinematographer, director (who we need to help us cast and direct actors), AD and sound design
- Understanding how to break down the script and consider what assets we need and how they will be built
- Understanding that using the current state of LED tech - is about environment soft light and images that are purposefully shot out of focus. cg assets that need to be created to make any environment that will be shot in focus are not going to be assets in the Games engine to go on the LED volume, but instead we will be using traditional VFX asset skills - building on the training undertaken in TOP and MOCO
- Understand the difference between onset grading versus shooting 'raw' and balance grading in post (in compositing).

Workshop 3a: Training in Unreal Engine
Workshop 3b: Special effects Make-up

Workshop 3c: Advanced Clean-up Techniques for Compositing
Workshop 3d: Houdini Fundamentals

Workshop 4: *COLOUR SPECIALISM* - Introduction to On-Line Editing
As the DFX department takes responsibility for delivering every major film and television project at the NFTS, the online editing aspects of the course provide the students with an essential skillset for finishing films and television programmes. We are fortunate to be able to offer several cutting edge online editing environments for tuition.

The emphasis is always on learning the craft rather than simply becoming proficient at operating the software. In this workshop that craft is finishing and mastering projects. Project management of this final link in the post-production chain is vital and the students learn skills to ensure that every project online at the NFTS is delivered on time, within budget and to precise technical and creative standards. The AVID Media Composer and Blackmagic Resolve editing systems are state-of-the-art suites designed with that purpose in mind and perfect for starting this process of learning.

Workshop 5: *COLOUR SPECIALISM* - Introduction to Colour Grading Platforms
The concepts and techniques of colour grading are covered in some depth by the tutors during the numerous tutorials. In total these sessions form an excellent foundation for this next workshop that concentrates on the pure aspects of colour grading. It is the first of several technical and creative workshops designed to guide the students through the colour grading minefield.

During this workshop students will be given comprehensive training on the schools three main grading systems:-

- Blackmangic Da Vinci Resolve
- Digital Vision Nucoda
- Filmlight Baselight

The colour grading techniques will be described in more complexity in future workshops, so the introduction has been designed to ensure that the students are familiar with the overall concepts and terminology of grading, as well as getting to grips with the colour grading panels – the universal control surface the colour graders use for controlling the software and changing the colours within the image.

Workshop 6: *COLOUR SPECIALISM* - Black and White Emulation
Achieving success in the field of colour grading requires an extensive knowledge of a variety of creative grading techniques. One such technique is the ability to emulate a “look” that a film has been shot using black and white film stock, as opposed to colour film stock.
This short exercise explores the techniques associated with black and white emulat.

NOTE:

Depending on the demands placed on the grading and online suites by the Graduation Portfolio, Workshops 4, 5 and 7 may have to be rearranged to take place at the beginning of the Second Year.

Workshop 1: *COLOUR SPECIALISM* - Online Editing Flame (Optional)
Another stage of tuition of online editing skills and techniques is designed to include an alternative online editing environment, the Autodesk Flame system. Here the tutors provoke a discussion that blurs the lines between colour grading, onlining and traditional visual effects work. It is important to understand the complex relationships between artist/operator and software/machine, as well as the importance of finding the right tool for the job.

The Autodesk Flame systems provide an ideal environment to explore a complex range of effects encountered in the online edit and offer an excellent opportunity to try out techniques, styles and working disciplines associated with short form post work, for example film and television commercials, promos and title sequences, as well as expanding on long form online disciplines such as colour grading, titles and credits.

Workshop 2: *COLOUR SPECIALISM* - Colour Theory and Grading Techniques
Colour grading as a discipline can sometimes be compared to sound design, in that the subtlest visual change can often significantly alter the viewer's perception and understanding of the story. Colour grading is, without doubt, an emotive discipline and this important workshop not only addresses the complexities of colour theory, it also challenges the students to think creatively about how they can improve the quality of the images to help improve the story and help the director realise his vision.

Whilst mastering the state-of-the-art Digital Vision Nucoda, Baselight and Resolve colour grading applications, the tutors will take the students on a visual journey. Visits to art galleries to study light and composition are an important part of understanding colour, as well as providing the students with a useful resource of styles to refer to in practice whilst grading. Tuition will include advanced colour management and colourimetery theory including ACES. Grading techniques will also be explored and the Nucoda, Baselight and Resolve provide an in-depth bridge between visual effects techniques and traditional colour grading methods including multiple secondary grades, advanced tracking, masks, grain management and applying image processing filters.

Students will be able to hone their grading skills during this period by grading the schools Question Documentary and First Year Film projects.

Workshop 3: *COLOUR SPECIALISM* - Online Editing/Finishing - AVID
The focus is on finishing within the AVID editing application. The tutor will recap on the main online disciplines and expand further into more complex Online Editing techniques and managing the project, communication and client liaison – also known as suite etiquette or diplomacy.

In addition to the advanced tuition on offer, the students also have the opportunity to practice their skills on real creative projects both from within the NFTS and from external sources. During any of the workshops or modules they may be tutored whilst finishing a project with a director or cinematographer present (and a deadline) – for example the TV pitch reels. These are the first of several modules where the DFX Colour students work very closely with the NFTS Television Directors. Here they project manage the online edit and final delivery of a Pitch Reel that would be sent to a Television Commissioning Editor.

Workshop 4: *COLOUR SPECIALISM* - Colour Fundamentals
During this ongoing workshop a tutor will set a brief for how a sequence should be graded and give you the required files / media. The student will, using his classroom machine over the next two weeks grade the project using Nucoda or Resolve. There will then be a review session in one of the school's cinemas where all the students can show their work an receive feedback on how well they have achieved the requirements of the brief.

Workshop 6: *COLOUR SPECIALISM* - Digital Film Project
This workshop aims to cover the 'business end' of final Post Production - mastering and delivering projects. Once the colour grade and other creative aspects of the film are complete, the film or TV programme is still some way from being finished. This workshop covers the terminology, technology and techniques concerning the final deliverables for a project.

DFX Colour students team up with editors and sound designers to finish the Digital Film Projects. The editors deliver a locked picture cut, sound designers create and deliver the final mix and DFX students grade, online and deliver the films.

The tutors ensure that all aspects of mastering are covered including adding of sync sound and ensuring all masters adhere to the strict NFTS Post-Production Protocol document. Using state-of-the-art applications, the students have the ideal toolset for understanding and delivering the final masters. Plenty of time is also spent on technical image monitoring and quality assurance.

Graduation Film & TV Productions and Games Portfolio
All through the 2nd year students have the opportunity to work together on amazing film and TV productions and games. Each of the directors from the five directing departments (Documentary, Science & Natural History, Television Entertainment, Fiction, and Animation and their team) and Games Design & Development - usually comprising one member of each of the other departments (Producing, Production Design, Cinematography etc.) - are given a budget, tutors and access to the all the NFTS resources to make a single film or TV project or Game to collectively display their newly acquired skills.

DFX students will team up with each of the directors and act as CG or Compositing Supervisor/Lead Artist for their final film or TV production, or help with Game assets. With some genres, for example Documentary, it is unlikely that their services will be required. However, the other five genres tend to kick up a fascinating range of VFX work to be done. Whereas the VFX students will work as a team across all the VFX requirements from the different genres (emulating a boutique VFX company), the Colour students can, and tend to, work across all six genres (emulating an in-house Colourist and Online Editor).

These sometimes simple, yet often complex ideas and collaborations will take up the majority of the remaining time and resources for the second year of study.

Graduation Film Involvement in Year One
(Collaboration with all Directing departments; Producers; 2nd Year DFX students)
It is unlikely that the 1st year DFX students will escape for Christmas without being involved in the 2nd Year graduation films. The 2nd Year DFX students will be supervising, and be totally absorbed by, these films and will be able to call on the 1st Year DFX students for assistance for several months towards the end of Year One. These activities could be anything from assisting with helping on set to complex 3D requirements, along with plenty of chance to practice roto, clean up, compositing and tracking.

Cross Specialisation Activities Year Two
As a rule, the DFX students can be approached during the later stages of their time at the NFTS and asked to work on individual shots or sequences for individual projects. The students organise these projects themselves, all of which are overseen by the DFX department.

Work Experience
The NFTS has developed and maintains excellent relationships throughout the film, TV and creative industries. Post Production houses and effects companies will be encouraged to mentor students from the start of the course and offer them work experience or a placement, although this can **never** be guaranteed. At the end of the course they will be given the first opportunity to look at the final showreel of the student and advise on future career prospects.

Work experience opportunities are more likely in the summer breaks in years one and two, or towards the last quarter of the programme. They could be for a period of between one and six weeks. Students may be formally assessed on their return to the School. Whilst we would like to be able to offer this opportunity to every course participant, we realise that we are at the mercy of the companies offering these opportunities. Despite any formal agreement between the NFTS and the individual companies, these arrangements are often subject to change at the last minute. In the interests of equality and impartiality, it is therefore essential that the students understand that there is no guarantee that any such opportunities will happen.

In addition, since summer of year two tends to be a hectic time for the second-year students working on graduation film and television projects, it is extremely likely that this commitment may also limit the student's ability to accept a work experience opportunity, even if it is offered. That aside, many students in the past have accepted

work experience opportunities that have led onto greater opportunities after the course.

Graduation Film Involvement in Year Two (Collaboration with all Directing departments, Production Design, Editors, Producers, Sound Designers and 1st Year DFX Departments)

The 2nd Year DFX students have the potential to be involved at some stage with all of the 2nd Year Graduation films. This is why the process begins for them from the beginning of year two to around Easter when they are involved at the scripting stage to identify any potential effects and shooting or pipeline requirements, and continue this involvement throughout the year until delivering the finished effects and/or delivering the finished game, film or television project. This involvement continues throughout the year, until delivering the final project, usually in November, December or January depending on the genre of production.

The objective is to give the DFX students the responsibility of working as a full VFX team across all the projects that require VFX from the documentary, animation, science and natural history and fiction film projects, –as well as the TV entertainment and games projects. The CG and Compositing students are charged with the group responsibility of planning, designing and delivering VFX, whilst the Colour students are responsible for planning the final online, grade and delivery. All DFX students are expected to offer advice on the most efficient post production route or pipeline.

During this process they liaise with the Producers and Directors to ensure that any VFX requirements are fulfilled. They have the option at any time of putting together and managing a team of artists from their own department if required, to ensure the effects are created on time.

The DFX CG students tend to have the involvement on Animation, S&NH, Games, Fiction and TV projects, supervising and managing the 3D pipeline, ensuring all the elements are rendered correctly and liaising with the Editor, Sound Designer, Compositor and Online Editor to ensure all the shots appear in the final edit, before handing over responsibility for the completion of the VFX shots to the Compositors.

The DFX Compositing students experience is very similar, managing the effects creation and delivery across any genre, either designing VFX from scratch, correcting or adjusting live action plates, designing digital matte paintings, or compositing the DFX CG students render passes, and liaising with the Editor, Sound Designer, Compositor and Online Editor to ensure all the shots appear in the final edit, before handing over responsibility for the finishing and mastering process to the DFX Colour student associated with the project.

The DFX Colour students deliver all of the Second Year Graduation films in time for the Graduation Ceremony Screenings at the NFTS Industry Screenings each year. They take responsibility for the Online Edit. During this process they liaise with the Editors to ensure they conform procedure works efficiently. They then work very closely with the Director from the Fiction, Documentary, S&NH, Animation or Television Entertainment Department, alongside the Cinematographer to help tell the story through the colour grading process, as well as with the Sound Designer and

Editor, in order to ensure the final soundtrack is synced to the final picture correctly. The DFX Colour students then have sole responsibility for mastering and delivering the film or television programme. They truly are the final, vital link in the chain.